Amendments to the Claims

This listing of claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims

~~Claim~~ 1. (Currently amended) [[:]] A method of measuring a signal transit time in a medical liquid required by a signal to pass through a measurement zone from an ultrasonic transmitter (2) to an ultrasonic receiver (3), ~~wherein~~ in which a line carrying the medical liquid is arranged in the measurement zone, ~~or for measuring changes in the signal transit time, whereby~~ comprising

emitting a step-like signal (10) with the ultrasonic transmitter (2) ~~emits a step-like signal (10), and~~ such that the step-like signal (10) passes through the measurement zone, resulting in an oscillation-like received signal (12) [[,]] oscillating about a resting level (11) on the ultrasonic receiver (3), the received signal being sampled at regular intervals Δt and detected,

checking the oscillator-like received signal (12) ~~is checked~~ on the basis of a selection criterion at least during a half-period (14, 15) to determine whether ~~it~~ the oscillator-like received signal (12) is the received signal produced by the step-like signal (10), and

when the result of this check is positive, <u>determining</u> the signal transit time or the change in the signal transit time ~~is determined~~ with ~~the help of~~ an interpolated or extrapolated contact point (20, 21) of the oscillator-like received signal (12) with the resting level (11) in a received signal-time diagram.

~~Claim~~ 2<u>.</u> (Currently amended) [[:]] The method according to Claim 1, ~~characterized in that~~ <u>wherein for determining the signal transit time,</u> the point used as the interpolated or extrapolated contact point is the point (21) in the received signal-time diagram at which the oscillator-like received signal (12) at the beginning of the first half-period (14) differs from the resting level (11) [[,]] ~~and the signal transit time is derived from the signal transit time thus determined~~.

~~Claim~~ 3<u>.</u> (Currently amended) [[:]] The method according to Claim 1, ~~characterized in that~~ <u>wherein for determining the change in signal transit time,</u> the point (20) in the received signal-time diagram at which the oscillator-like received signal (12) intersects the resting level (11) after the first half-period (14) is determined as the interpolated or extrapolated contact point [[,]] ~~and the change in signal transit time is derived from the time thus determined~~.

Claim 4. (Currently amended)[[:]] The method according claim 1, ~~characterized in that the~~ wherein an area enclosed between the oscillator-like received signal (12) and the resting level (11) is determined during the half-period (14).

Claim 5. (Currently amended)[[:]] The method according to Claim 4, ~~characterized in that~~ wherein the area ~~thus~~ determined is compared with a reference value as the selection criterion.

Claim 6. (Currently amended)[[:]] The method according to Claim 4, ~~characterized in that~~ wherein the subsequent half-period (15) is ~~also~~ sampled and detected, and the area enclosed between the oscillator-like received signal (12) and the resting level (11) is determined during the subsequent half-period (15).

Claim 7. (Currently amended)[[:]] The method according to Claim 6, ~~characterized in that~~ wherein the area enclosed between the oscillator-like received signal (12) and the resting level (11) is compared with a reference value as the selection criterion during a subsequent half-period (15).

Claim 8. (Currently amended)[[:]] The method according to claim 1, ~~characterized in that the~~ wherein an extreme value (18) of the oscillator-like received signal (12) is determined during the half-period (14) and is compared with a reference value.

Claim 9̶ (Currently amended) [[:]] The method according to Claim 8, c̶h̶a̶r̶a̶c̶t̶e̶r̶i̶z̶e̶d̶ ̶i̶n̶ ̶t̶h̶a̶t̶ wherein the subsequent half-period (15) is sampled and detected and t̶h̶e̶ an extreme value (19) of the oscillator-like received signal (12) is determined during the subsequent half-period (15) and compared with a reference value.

Claim 10̲ (Currently amended) [[:]] The method according to claim 1, c̶h̶a̶r̶a̶c̶t̶e̶r̶i̶z̶e̶d̶ ̶i̶n̶ ̶t̶h̶a̶t̶ wherein the duration of one or more half-periods (14, 15) of the oscillator-like received signal (12) is determined as the selection criterion and is compared with a reference value.

Claim 11̲ (Currently amended) [[:]] The method according to claim 1, c̶h̶a̶r̶a̶c̶t̶e̶r̶i̶z̶e̶d̶ ̶i̶n̶ ̶t̶h̶a̶t̶ wherein the resting level (11) is determined as the average of received signal samples (13) preceding the half-period (14).

Claim 12̲ (Currently amended) [[:]] The method according to Claim 4, c̶h̶a̶r̶a̶c̶t̶e̶r̶i̶z̶e̶d̶ ̶i̶n̶ ̶t̶h̶a̶t̶ wherein the a̶r̶e̶a̶s̶ ̶t̶h̶u̶s̶ area determined a̶r̶e̶ is analyzed as a measure of the attenuation of the signal.

Claim 13̲ (Currently amended) [[:]] The method according to claim 1, c̶h̶a̶r̶a̶c̶t̶e̶r̶i̶z̶e̶d̶ ̶i̶n̶ ̶t̶h̶a̶t̶ wherein the medical liquid is blood, d̶i̶a̶l̶y̶i̶s̶ dialysis liquid or an infusion liquid.

~~Claim~~ 14. (Currently amended)[[:]] A device for use of the method according to claim 1, comprising

an ultrasonic transmitter (2) for emitting the step-like signal (10),

an ultrasonic receiver (3) which is separated from the ultrasonic transmitter (2) by the measurement zone for delivering a received signal (12) which oscillates about a resting level (11) as the response to the step-like (10) signal passing through the measurement zone,

a line (1) arranged in the measurement zone carrying a medical liquid,

an analyzer unit (6) that is connected to the ultrasonic transmitter (2) and the ultrasonic receiver (3),

~~whereby~~ the analyzer unit (6) ~~receives~~ receiving synchronized signals for sending the transmission signal and ~~has~~ having a sampling device for sampling and storing the oscillator-like received signal (12) at regular intervals Δt,

~~whereby~~ the analyzer unit (6) ~~is also suitable~~ being configured for checking on the oscillator-like received signal (12) on the basis of a selection criterion at least during a half-period (14, 15) to determine whether ~~it~~ the signal is the received signal caused by the step-like signal (10), and

if the result of the test is positive, ~~to determine~~ for determining the signal transit time or the change in the signal transit time of an interpolated or extrapolated contact point (20, 21) of the oscillator-like received signal (12) with a resting level (11) in a received signal-time diagram.

~~Claim~~ 15. (Currently amended) [[:]] The device according to Claim 14, ~~characterized in that~~ wherein the analyzer unit (6) is ~~also suitable~~ configured for analyzing at least one of the signal transit time ~~and/or~~ and the change in signal transit time as a measure of at least one of the composition ~~and/or~~ and the change in composition of the medical liquid on the basis of stored information.

~~Claim~~ 16. (Currently amended) [[:]] The device according to ~~Claims~~ Claim 14, ~~characterized in that~~ wherein the medical liquid is blood, dialysis liquid or an infusion liquid.

~~Claim~~ 17. (Currently amended) [[:]] The device according to Claim 16, ~~characterized in that it~~ wherein the device is a blood volume sensor.

~~Claim~~ 18. (Currently amended) [[:]] The device according to Claim 17, ~~characterized in that it~~ wherein the device is the blood volume sensor ~~also~~ and an air detection sensor.